

Activity book
for the Young at
Heart

By Irene Beckman
And Alex Johnson

Can you put the problems in the correct category?

NP

P

Finding the genome

Independent edge sets

Determining primes

SAT

Subset Sum

Knapsack

Minesweeper

NP Hard

Pegboard

Greatest common divisor

Euler Cycle

Alternating graph reachability

What would happen if P=NP ...

lal

nyrceotnip

doluw

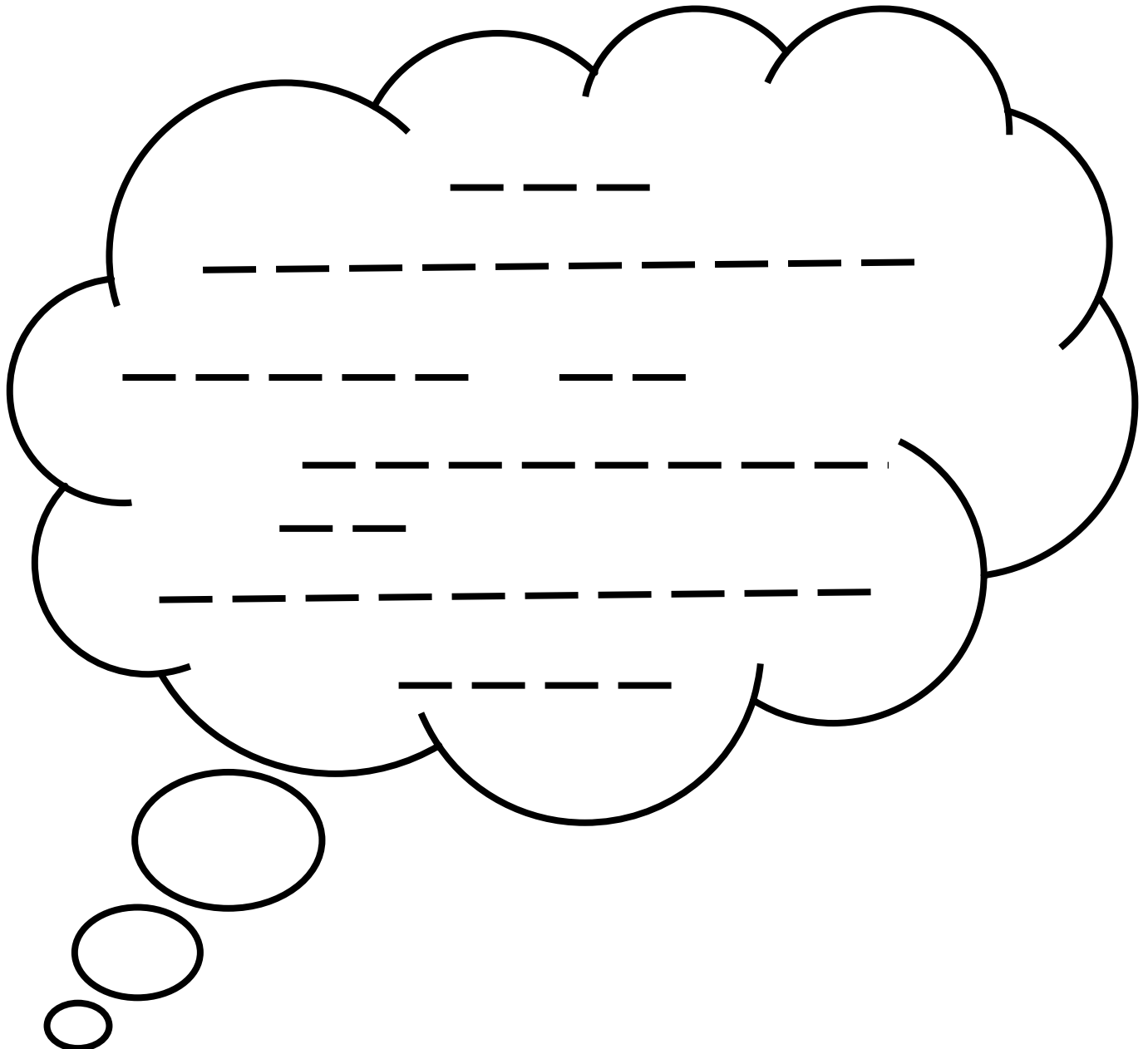
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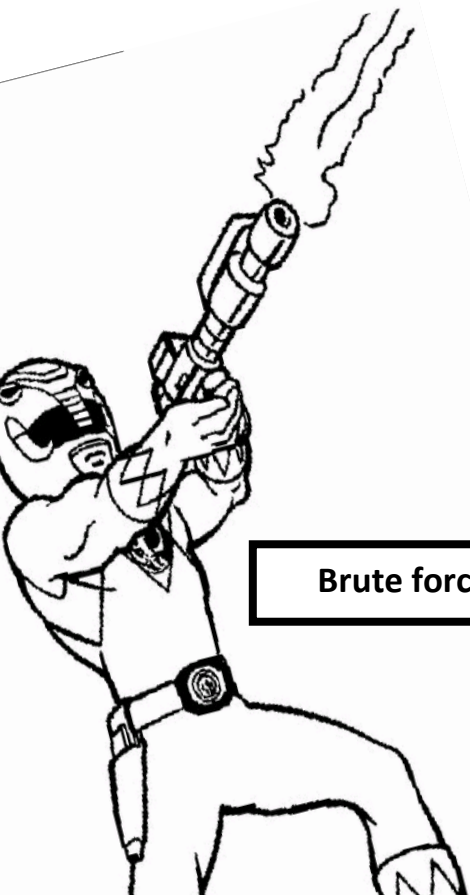
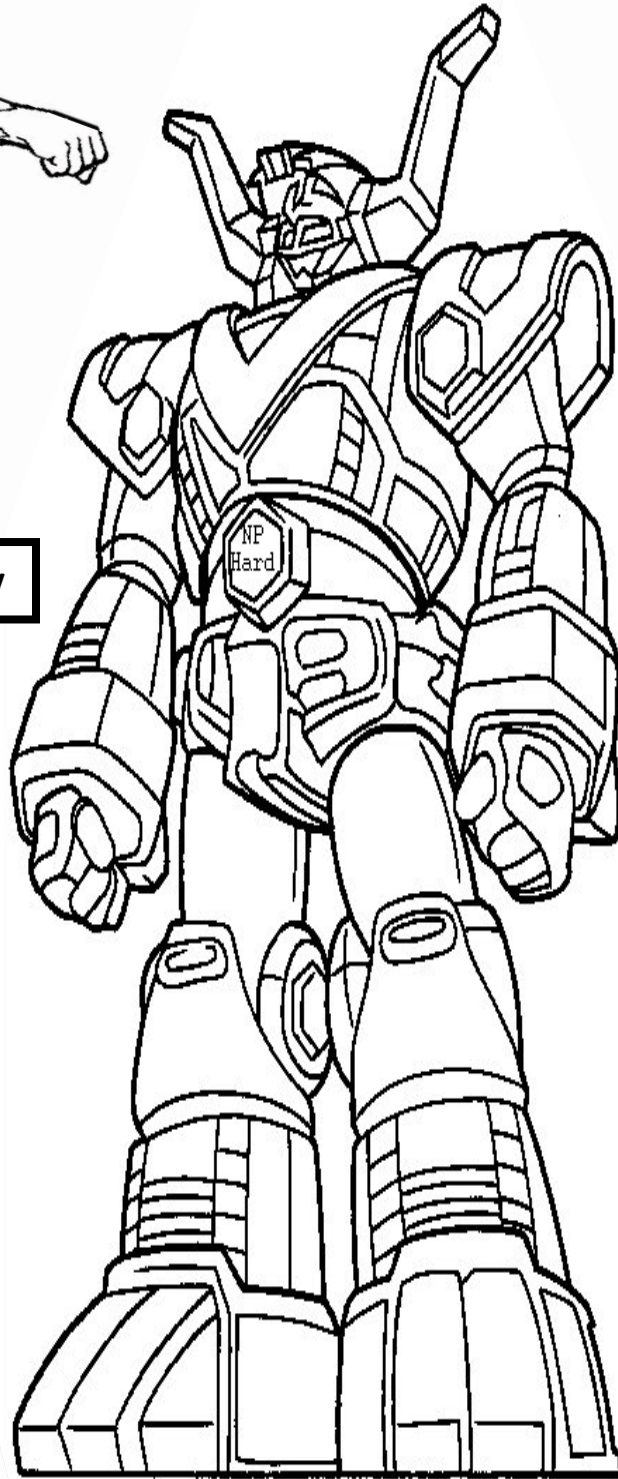




Parameterized Complexity



heuristics



Brute force

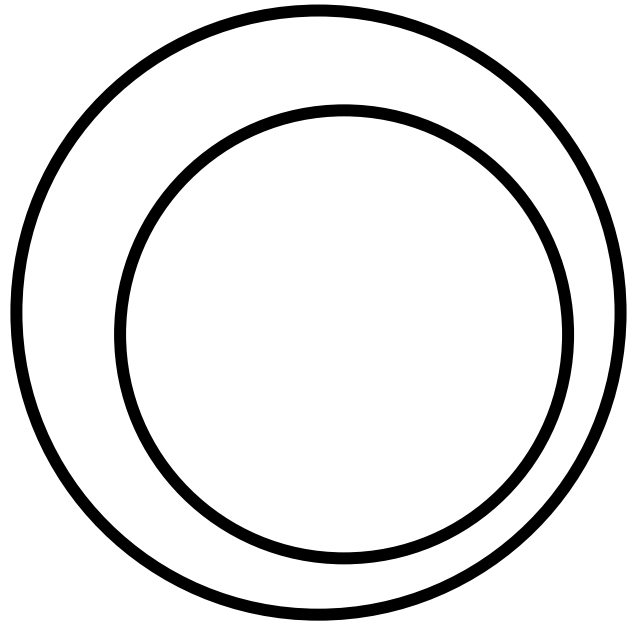


Average-Case Complexity

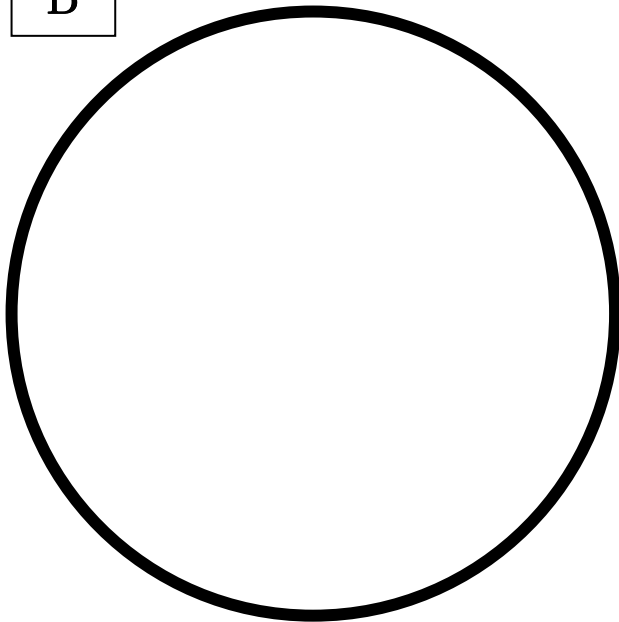
Matching

Can you tell which ones are the same?

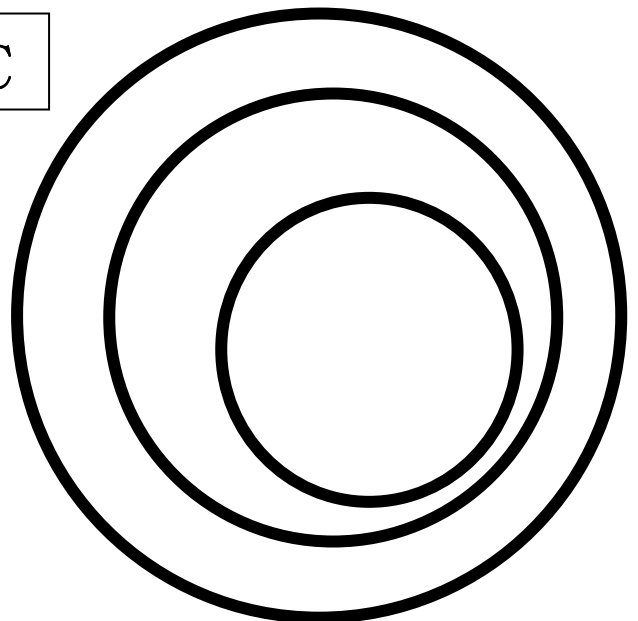
A



B

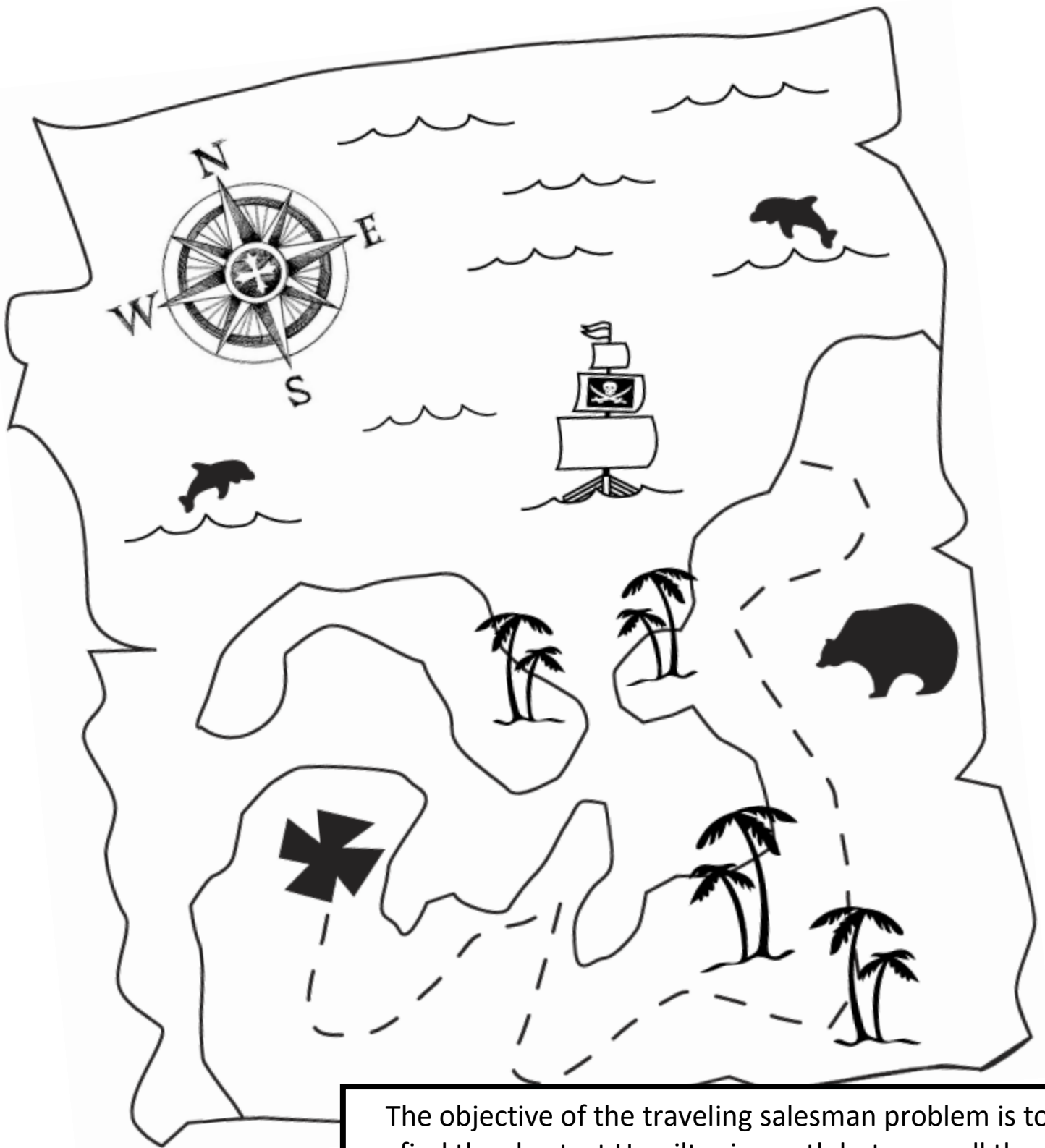


C



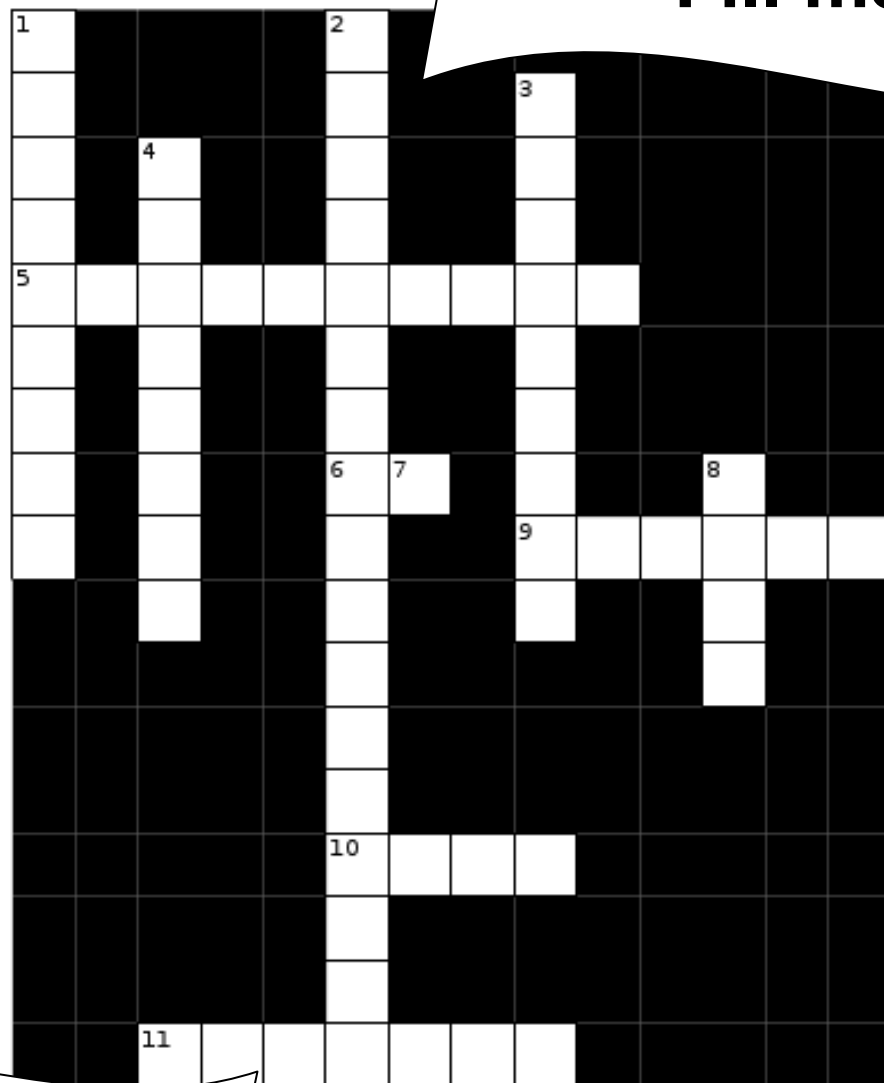
Who am I ?

While I am most famous for my incompleteness theorems, I am actually the first person to introduce the $P=NP$ problem. I won the National Medal of Science in 1974 but died four years later overcome with the fear of being poisoned.



The objective of the traveling salesman problem is to find the shortest Hamiltonian path between all the nodes in a given graph. This problem has been shown to be NP Complete, which means that the run time for an algorithm increases exponentially with the size of the input. This problem has been successfully solved for up to 85,900 input cities using certain acceleration techniques. Color in the path!

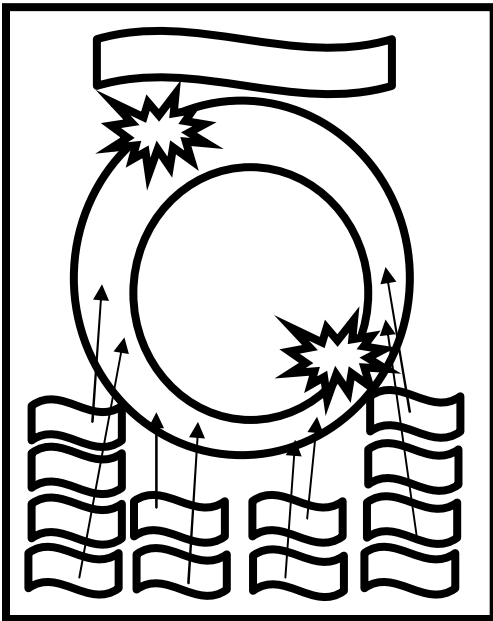
Fill me in



Using these clues

- Across
- 5 Run-time _____
 - 6 Can't be solved in a reasonable amount of time
 - 9 As hard as any NP problem (2 words)
 - 10 Algorithm for factoring on a quantum computer
 - 11 Computer that uses single atoms to represent bits

- Down
- 1 Technique used for determining NP-Completeness
 - 2 NP-Complete problem where you try to find the shortest path between all the nodes of a graph (2 words)
 - 3 One reason why security specialists hope $NP \neq P$
 - 4 NP _____
 - 7 Is solvable in a reasonable amount of time
 - 8 Gave a list of 21 NP-Complete problems in 1972



All encryption would be solvable in polynomial time

A thought bubble containing a complex, stylized symbol that resembles a combination of the letters 'E' and 'S'.

UNKNOWN!

A diagram with the text "UNKNOWN!" at the top. Below it, there are two circles. The left circle is a simple outline. The right circle is a thick double-line outline. Three small squares are positioned around the circles: one to the left of the simple circle, one above the double-line circle, and one between the two circles.



A crossword puzzle grid with the following words filled in:

- Vertical words (left to right):
 - REDUCED
 - COMPLEXITY
 - IONTE
 - TRAVEL
 - SHOR
 - QUANTUM
- Horizontal words (top to bottom):
 - FACTORY
 - KNIGHT
 - PHARD
 - MA